

Investigating the Role of Anesthesia Technicians in Promoting Safe Medication Practices and Preventing Medication Errors in the Operating Rooms of Hafr Al-Batin Hospitals: A Qualitative Study

Seadoun Raheel N Aldhafeeri¹, Mashref Ytaim R Aldhafeeri¹, Meshari Tuwayrish Shnan Alshammari¹, Faris Aiydh M Alanazi¹, Fahad Eissa Alanazi¹, Omar Abdullah W Aloslib¹

¹Technician-Anesthesia Technology

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ABSTRACT

Medication errors in the operating room can have severe consequences for patient safety. Anesthesia technicians play a crucial role in promoting safe medication practices and preventing medication errors. This qualitative study aims to investigate the role of anesthesia technicians in promoting safe medication practices and preventing medication errors in the operating rooms of Hafr Al-Batin hospitals. Semi-structured interviews were conducted with 20 anesthesia technicians purposively selected from three hospitals in Hafr Al-Batin. Thematic analysis was used to identify key themes and subthemes. The findings revealed that anesthesia technicians contribute to safe medication practices through their roles in medication preparation, double-checking, and communication with the anesthesia team. They also identified challenges such as workload, distractions, and inadequate training that may hinder their ability to prevent medication errors. The study highlights the importance of recognizing and supporting the role of anesthesia technicians in promoting patient safety in the operating room. Recommendations include providing targeted training, fostering a culture of safety, and improving communication and collaboration among the anesthesia team.

Keywords: anesthesia technicians, medication errors, patient safety, operating room, qualitative research

1. INTRODUCTION

Medication errors are a significant concern in healthcare, particularly in the operating room where patients are vulnerable and the consequences of errors can be severe (Nanji et al., 2016). Anesthesia technicians are integral members of the anesthesia team and play a vital role in promoting safe medication practices and preventing medication errors (Bangash et al., 2020). However, their specific roles and contributions in this regard have not been extensively explored, especially in the context of Hafr Al-Batin hospitals.

This qualitative study aims to investigate the role of anesthesia technicians in promoting safe medication practices and preventing medication errors in the operating rooms of Hafr Al-Batin hospitals. By understanding their experiences, challenges, and perspectives, this study seeks to provide insights that can inform strategies to enhance patient safety in the operating room.

2. LITERATURE REVIEW

2.1 Medication Errors in the Operating Room

Medication errors in the operating room are a significant patient safety concern. A systematic review by Nanji et al. (2016) found that medication errors occur in approximately 1 in 20 perioperative medication administrations. These errors can have serious consequences, including harm to patients, increased healthcare costs, and legal implications (Wahr et al., 2017).

Several factors contribute to the occurrence of medication errors in the operating room, such as the fast-paced and complex nature of the environment, multiple medications being used, and the involvement of various healthcare professionals (Grigg et al., 2017). Therefore, it is crucial to understand the roles and responsibilities of each team member, including anesthesia technicians, in preventing medication errors.

2.2 Role of Anesthesia Technicians

Anesthesia technicians are essential members of the anesthesia team, working alongside anesthesiologists and nurse anesthetists to ensure the safe and efficient delivery of anesthesia care (Bangash et al., 2020). Their roles

and responsibilities vary depending on the healthcare setting and local regulations but generally include tasks such as preparing and maintaining anesthesia equipment, assisting with patient monitoring, and managing supplies and medications (American Society of Anesthesia Technologists and Technicians, 2021).

While the role of anesthesia technicians in promoting safe medication practices has been acknowledged, there is limited research specifically focusing on their contributions and experiences in this area. A study by Dhakal et al. (2019) highlighted the importance of anesthesia assistants in medication safety, noting their involvement in medication preparation and administration under the supervision of anesthesiologists. However, more in-depth exploration is needed to understand the specific ways in which anesthesia technicians promote safe medication practices and prevent medication errors in the operating room.

2.3 Strategies for Preventing Medication Errors

Various strategies have been proposed and implemented to prevent medication errors in the operating room. These include the use of standardized medication labeling and storage systems, barcode technology for medication verification, and the implementation of double-checking protocols (Grigg et al., 2017; Wahr et al., 2017).

Effective communication and teamwork among the anesthesia team have also been identified as crucial factors in preventing medication errors (Bangash et al., 2020). A study by Pham et al. (2019) found that teamwork training for the anesthesia team, including anesthesia technicians, improved communication and reduced the incidence of medication errors in the operating room.

Despite these strategies, medication errors continue to occur, highlighting the need for ongoing efforts to identify and address the challenges and barriers to safe medication practices in the operating room. Investigating the perspectives and experiences of anesthesia technicians can provide valuable insights into these challenges and inform the development of targeted interventions to enhance patient safety.

3. METHODS

3.1 Study Design

This study employed a qualitative research design using semi-structured interviews to explore the role of anesthesia technicians in promoting safe medication practices and preventing medication errors in the operating rooms of Hafr Al-Batin hospitals. Qualitative research allows for an in-depth understanding of participants' experiences, perceptions, and insights (Creswell & Poth, 2018).

3.2 Participants and Setting

Purposive sampling was used to recruit 20 anesthesia technicians from three hospitals in Hafr Al-Batin. Inclusion criteria were being an anesthesia technician with at least one year of experience working in the operating room of a Hafr Al-Batin hospital. Participants were recruited through email invitations and in-person meetings with the assistance of the anesthesia departments in each hospital.

3.3 Data Collection

Semi-structured interviews were conducted with each participant, lasting approximately 45-60 minutes. The interviews were guided by an interview protocol developed based on the research questions and existing literature. The protocol included open-ended questions exploring participants' roles and responsibilities, experiences with safe medication practices, challenges encountered, and suggestions for improvement.

Interviews were conducted in a private setting within the hospitals, and participants provided informed consent prior to the interviews. All interviews were audio-recorded and transcribed verbatim for analysis.

3.4 Data Analysis

Thematic analysis was used to analyze the interview data, following the six-phase approach outlined by Braun and Clarke (2006). The analysis involved familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report.

Two researchers independently coded the data and discussed any discrepancies to reach a consensus. NVivo 12 software was used to manage and organize the data during the analysis process.

3.5 Trustworthiness

To ensure the trustworthiness of the findings, several strategies were employed. Credibility was enhanced through member checking, where participants were provided with a summary of their interviews and asked to confirm the accuracy of the interpretations. Transferability was addressed by providing detailed descriptions of the study context and participants. Dependability was ensured through the use of an audit trail, documenting the research process and decisions made. Confirmability was addressed through researcher reflexivity and the use of direct quotes to support the findings.

4. RESULTS

The thematic analysis revealed three main themes: (1) roles and contributions of anesthesia technicians in promoting safe medication practices, (2) challenges encountered in preventing medication errors, and (3) suggestions for improvement.

4.1 Roles and Contributions of Anesthesia Technicians

Participants described their roles in promoting safe medication practices in the operating room, which included medication preparation, double-checking, and communication with the anesthesia team.

4.1.1 Medication Preparation

Anesthesia technicians were responsible for preparing medications according to the anesthesiologist's orders and ensuring the correct labeling and storage of medications. One participant stated, "I make sure that the medications are prepared correctly, labeled properly, and stored in the designated areas to avoid mix-ups or confusion."

4.1.2 Double-Checking

Participants emphasized the importance of double-checking medications with the anesthesiologist or nurse anesthetist before administration. They described their role in verifying the "five rights" of medication administration: right patient, right drug, right dose, right route, and right time. As one participant explained, "We always double-check the medications with the anesthesiologist to ensure that we have the correct drug, dose, and route before administering it to the patient."

4.1.3 Communication with the Anesthesia Team

Effective communication within the anesthesia team was highlighted as a crucial factor in promoting safe medication practices. Anesthesia technicians reported actively participating in pre-operative briefings and intraoperative discussions to clarify medication orders and address any concerns. One participant shared, "We have open communication with the anesthesiologists and nurse anesthetists. If there's any doubt or confusion about a medication order, we speak up and clarify it before proceeding."

4.2 Challenges Encountered in Preventing Medication Errors

Participants identified several challenges that may hinder their ability to prevent medication errors in the operating room.

4.2.1 Workload and Time Pressure

High workload and time pressure were frequently mentioned as barriers to safe medication practices. Participants described situations where they had to manage multiple tasks simultaneously, which increased the risk of errors. One participant stated, "Sometimes, when we're really busy and there are back-to-back cases, it can be challenging to maintain the same level of focus and attention to detail in preparing and checking medications."

4.2.2 Distractions and Interruptions

Distractions and interruptions in the operating room environment were also identified as challenges. Participants reported that phone calls, conversations, and equipment alarms could divert their attention from medication-related tasks, increasing the likelihood of errors. As one participant explained, "There are a lot of distractions in the operating room, and it's easy to get sidetracked. We have to make a conscious effort to stay focused on the task at hand, especially when it comes to medications."

4.2.3 Inadequate Training and Education

Some participants expressed concerns about inadequate training and education specific to medication safety. They noted that while they received general training as anesthesia technicians, more targeted education on safe medication practices and error prevention strategies would be beneficial. One participant suggested, "It would be helpful to have more in-depth training on medication safety, including case studies and simulations, to better prepare us for the challenges we may face in the operating room."

4.3 Suggestions for Improvement

Participants offered several suggestions to enhance safe medication practices and prevent medication errors in the operating room.

4.3.1 Standardized Medication Processes

Implementing standardized medication processes, such as using pre-filled syringes and color-coded labels, was suggested as a way to reduce the risk of errors. One participant recommended, "Having a standardized system for medication preparation and labeling across all operating rooms would help minimize confusion and ensure consistency in our practices."

4.3.2 Technology and Automated Systems

Participants also proposed the use of technology and automated systems to support safe medication practices. Bar-code scanning for medication verification and electronic medication administration records were mentioned as potential solutions. As one participant explained, "Implementing bar-code scanning for medications would add an extra layer of safety by ensuring that we have the right drug and dose before administration."

4.3.3 Ongoing Education and Training

Continuous education and training on medication safety were emphasized as essential for anesthesia technicians. Participants suggested regular in-service training sessions, workshops, and simulation-based learning opportunities to reinforce safe medication practices and error prevention strategies. One participant stated, "Ongoing education and training are crucial to keep us updated on best practices and help us maintain our skills in promoting medication safety."

5. DISCUSSION

This qualitative study provides valuable insights into the role of anesthesia technicians in promoting safe medication practices and preventing medication errors in the operating rooms of Hafr Al-Batin hospitals. The findings highlight the multifaceted contributions of anesthesia technicians, including medication preparation, double-checking, and communication with the anesthesia team.

The study reveals that anesthesia technicians play a crucial role in ensuring the accuracy and safety of medication preparation, which is consistent with previous research (Dhakal et al., 2019). Their involvement in double-checking medications with the anesthesiologist or nurse anesthetist before administration serves as an important safeguard against errors. This finding underscores the importance of teamwork and collaboration within the anesthesia team, as emphasized in the literature (Bangash et al., 2020; Pham et al., 2019).

The challenges identified by participants, such as workload, distractions, and inadequate training, shed light on the barriers to safe medication practices in the operating room. These findings are consistent with previous studies that have recognized the impact of workload and interruptions on medication safety (Grigg et al., 2017; Wahr et al., 2017). The participants' experiences highlight the need for strategies to manage these challenges, such as optimizing staffing levels, minimizing distractions, and providing targeted education and training.

The suggestions for improvement offered by participants align with evidence-based strategies for preventing medication errors in the operating room. Standardizing medication processes, utilizing technology and automated systems, and providing ongoing education and training have been identified as effective interventions in the literature (Grigg et al., 2017; Wahr et al., 2017). Implementing these strategies in Hafr Al-Batin hospitals could enhance medication safety and reduce the risk of errors.

The findings of this study have implications for practice, policy, and research. Healthcare organizations should recognize and support the vital role of anesthesia technicians in promoting safe medication practices. This can be achieved through providing targeted education and training, fostering a culture of safety, and promoting effective communication and collaboration among the anesthesia team. Policymakers should consider the development of guidelines and standards specific to the role of anesthesia technicians in medication safety, ensuring consistency across healthcare settings.

Future research could build upon the findings of this study by exploring the perspectives of other members of the anesthesia team, such as anesthesiologists and nurse anesthetists, on the role of anesthesia technicians in promoting safe medication practices. Additionally, quantitative studies could investigate the impact of specific interventions, such as standardized medication processes or technology-based solutions, on the incidence of medication errors in the operating room.

6. CONCLUSION

This qualitative study provides valuable insights into the role of anesthesia technicians in promoting safe medication practices and preventing medication errors in the operating rooms of Hafr Al-Batin hospitals. The findings highlight the multifaceted contributions of anesthesia technicians, including medication preparation, double-checking, and communication with the anesthesia team. The challenges identified, such as workload, distractions, and inadequate training, underscore the need for targeted interventions to support anesthesia technicians in their efforts to ensure medication safety.

The study emphasizes the importance of recognizing and supporting the vital role of anesthesia technicians in promoting patient safety in the operating room. Healthcare organizations, policymakers, and researchers should

collaborate to develop and implement strategies that empower anesthesia technicians and enhance their ability to prevent medication errors. By doing so, we can create a safer healthcare environment for patients undergoing surgical procedures in Hafr Al-Batin hospitals and beyond.

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